

CLAIM AMENDMENTS

This listing of claims will replace all prior versions and listings of claims in the application.

1 1. (Currently Amended) A method of monitoring and diagnosing resource
2 utilization within a connection oriented network made of network elements, at least
3 one of said network elements including a connection resource tracker for
4 maintaining a database of resource utilization, the method comprising the steps of:

5 specifying a plurality of resource types for the network elements of the
6 connection oriented network, each resource type being defined by a capacity limit
7 and a utilization;

8 providing a utilization threshold and a specified threshold for each specified
9 type of resource, wherein the utilization threshold is set at a threshold value used to
10 determine whether resources are being over-utilized and the specified threshold is
11 set at a threshold value used to determine whether resources used are exceeding a
12 maximum allowable limit;

13 measuring the utilization for all resources at the network elements;

14 in response to a query from a user relating to a particular type of resource,
15 comparing the utilization for all resources of the particular type as measured in the
16 measuring step with the utilization threshold for said particular type for
17 determining whether the utilization of any resource of said particular type is above
18 the corresponding utilization threshold;

19 if the utilization is above the corresponding utilization threshold for at least
20 one said resource, generating a report and identifying in the report each resource of
21 the particular type for which the utilization is above the corresponding utilization
22 threshold and presenting the report to an operator of said connection oriented
23 network; and

24 if the utilization is above the corresponding specified threshold for at least
25 one said resource, checking a timer associated with the resource; and

when the timer has expired, generating an alarm for the resource and resetting the timer associated with the resource only when the alarm has been generated for the resource.

2. (Currently Amended) The method of claim 1, wherein the plurality of resource types includes at least one of bandwidth, line card capacity, number of connection end points per line card, Virtual Path Identifier numbers, Virtual Connection Identifier numbers, MultiProtocol Label Switching (MPLS) label numbers, memory within the switch, number of supportable leaf endpoints per system, number of supportable connections in a connecting state, number of ~~MPSL~~-MPLS state blocks, and number of connections in a database.

3. (Currently Amended) The method of claim 1, wherein the step of comparing the utilization for all resources is carried out only with respect to resources within a list of resources.

4. (Currently Amended) The method of claim 3, ~~wherein the step of providing at least one utilization threshold comprises~~ further comprising:
receiving at least one utilization threshold from ~~an~~ the operator.

5. (Canceled)

6. (Currently Amended) The method of claim 1, wherein the step of generating the report further comprises:
receiving at least one utilization threshold from ~~an~~ the operator.

7. (Currently Amended) The method of claim 1, wherein the step of generating the report further comprises:
including the utilization of any identified resources in the report.

1 8. (Currently Amended) The method of claim 7, wherein[(:)] the step of specifying
2 the plurality of resource types further comprises;

3 providing a list of resources, the list of resources including at least one of
4 bandwidth, line card capacity, number of connection end points per line card,
5 Virtual Path Identifier numbers, Virtual Connection Identifier numbers,
6 MultiProtocol Label Switching (MPLS) label numbers, memory within the switch,
7 number of supportable leaf endpoints per system, number of supportable
8 connections in a connecting state, number of MPLS state blocks, and number of
9 connections in a database, the step of generating the report is carried out only with
10 respect to resources within the list of resources, and ~~the step of providing at least~~
11 ~~one utilization threshold comprises further comprising:~~

12 receiving at least one utilization threshold from ~~an~~ the operator.

1 9. (Currently Amended) The method of claim 1, further comprising the steps of:
2 upon identification of a resource for which the utilization is above the
3 specified threshold, generating an alarm identifying the resource; and
4 presenting the alarm to ~~an~~ the operator.

1 10. (Currently Amended) The method of claim 1, ~~wherein the step of providing at~~
2 ~~least one utilization threshold comprises further comprising:~~
3 receiving at least one utilization threshold from ~~an~~ the operator.

1 11. (Currently Amended) The method of claim 1, wherein the step of determining
2 whether ~~a~~ the utilization of ~~a~~ the resource is above the corresponding utilization
3 threshold and the step of identifying each such resource are carried out repeatedly.

1 12. (Currently Amended) The method of claim 1, further comprising:
2 a step of pausing after the step of identifying each resource for which the
3 utilization is above the corresponding utilization threshold.

1 13. (Currently Amended) The method of claim 1, further comprising:

2 monitoring for receipt of call connection establishment signals, wherein the
3 step of determining whether ~~a~~the utilization of ~~a~~the resource is above the
4 corresponding utilization threshold and the step of identifying each such resource
5 are carried out only upon receipt of a call connection establishment signal.

1 14. (Currently Amended) The method of claim 13, further comprising:

2 determining whether ~~an~~the alarm has been generated since the utilization of
3 the resource last rose above the specified threshold,

4 wherein the step of generating ~~an~~the alarm is carried out only if ~~an~~the
5 alarm has not been generated since the utilization of the resource last rose above
6 the specified threshold.

1 15. (Currently Amended) The method of claim 14, wherein the step of generating a
2 the report further comprises:

3 including the utilization of any identified resources in the report.
4

1 16. (Currently Amended) The method of claim 15, wherein[[:]] the step of
2 specifying the plurality of resource types further comprises:

3 providing a list of resources, the list of resources including at least one of
4 bandwidth, line card capacity, number of connection end points per line card,
5 Virtual Path Identifier numbers, Virtual Connection Identifier numbers,
6 MultiProtocol Label Switching (MPLS) label numbers, memory within the switch,
7 number of supportable leaf endpoints per system, number of supportable
8 connections in a connecting state, number of MPLS state blocks, and number of
9 connections in a database, the step of determining whether ~~a~~the utilization of ~~a~~the
10 resource is above the corresponding utilization threshold is carried out only with
11 respect to resources within the list of resources, and ~~the step of providing at least~~
12 one utilization threshold comprises further comprising:

13 receiving at least one utilization threshold from ~~an~~the operator.

1 17. (Currently Amended) A processor for monitoring resource utilization within a
2 connection oriented ~~switch~~-network made of network elements, at least one of said
3 network elements including a connection resource tracker for maintaining a
4 database of resource utilization, the processor comprising:

5 instructions for specifying a plurality of resource types for the network
6 elements of the connection oriented network, each resource type being defined by a
7 capacity limit and a utilization;

8 instructions for providing a utilization threshold and a specified threshold for
9 each specified type of resource, wherein the utilization threshold is set at a
10 threshold value used to determine whether resources are being over-utilized and
11 the specified threshold is set at a threshold value used to determine whether
12 resources used are exceeding a maximum allowable limit;

13 instructions for measuring the utilization for all resources at the network
14 elements;

15 instructions for, in response to a query from a user relating to a particular
16 type of resource in said database, comparing the measured utilization for all
17 resources of the particular type with the utilization threshold for said particular
18 type for determining whether the utilization of any resource of said particular type
19 is above the corresponding utilization threshold;

20 instructions for, if the utilization is above the corresponding utilization
21 threshold for at least one said resource, generating a report and identifying in the
22 report each resource of the particular type for which the utilization is above the
23 corresponding utilization threshold and presenting the report to an operator of said
24 connection oriented network; and

25 instructions for, if the utilization is above the corresponding specified
26 threshold for at least one said resource, checking a timer associated with the
27 resource;

instructions for, when the timer associated with the resource has expired, generating an alarm for the resource and resetting the timer associated with the resource only when the alarm has been generated for the resource.

18. (Currently Amended) The processor of claim 17, wherein the plurality of resources includes at least one of bandwidth, line card capacity, number of connection end points per line card, Virtual Path Identifier numbers, Virtual Connection Identifier numbers, MultiProtocol Label Switching (MPLS) label numbers, memory within the switch, number of supportable leaf endpoints per system, number of supportable connections in a connecting state, number of MPLS state blocks, and number of connections in a database.

19. (Currently Amended) The processor of claim 17, further comprising:
instructions for providing a list of resources, and wherein the instructions for determining whether a ~~the~~ utilization of a ~~the~~ resource is above the corresponding utilization threshold make this determination only with respect to resources within the list of resources.

20. (Currently Amended) The processor of claim 19, ~~wherein the instructions for providing at least one utilization threshold comprise further comprising:~~
instructions for receiving at least one utilization threshold from an ~~the~~ operator.

21. (Canceled)

22. (Currently Amended) The processor of claim 17, ~~wherein the instructions for providing at least one utilization threshold comprise further comprising:~~
instructions for receiving at least one utilization threshold from an ~~the~~ operator.

1 23. (Currently Amended) The processor of claim 17, wherein the instructions for
2 generating the report further comprise;

3 instructions for including the utilization of any identified resources in the
4 report.

1 24. (Currently Amended) The processor of claim 23, further comprising:

2 instructions for providing a list of resources, the list of resources including at
3 least one of bandwidth, line card capacity, number of connection end points per line
4 card, Virtual Path Identifier numbers, Virtual Connection Identifier numbers,
5 MultiProtocol Label Switching (MPLS) label numbers, memory within the switch,
6 number of supportable leaf endpoints per system, number of supportable
7 connections in a connecting state, number of MPLS state blocks, and number of
8 connections in a database, wherein the instructions for determining whether a ~~the~~
9 utilization of ~~a the~~ resource is above the corresponding utilization threshold are
10 executed only with respect to resources within the list of resources, and ~~wherein the~~
11 ~~instructions for providing at least one utilization threshold comprise further~~
12 ~~comprising;~~

13 instructions for receiving at least one utilization threshold from ~~an the~~
14 operator.

1 25. (Currently Amended) The processor of claim 17, further comprising:

2 instructions for, upon identification of a resource for which the utilization is
3 above the specified threshold, generating an alarm identifying the resource; and

4 instructions for presenting the alarm to ~~an the~~ operator.

1 26. (Currently Amended) The processor of claim 25, ~~wherein the instructions for~~
2 ~~providing at least one utilization threshold comprise further comprising;~~

3 instructions for receiving at least one utilization threshold from ~~an the~~
4 operator.

1 27. (Currently Amended) The processor of claim 25, further comprising:
2 instructions for executing the instructions for determining whether a ~~the~~
3 utilization of a ~~the~~ resource is above the corresponding utilization threshold and the
4 instructions for identifying each such resource repeatedly.

1 28. (Currently Amended) The processor of claim 27, further comprising:
2 instructions for pausing after the instructions for identifying each resource
3 for which the utilization is above the corresponding utilization threshold are
4 executed.

1 29. (Currently Amended) The processor of claim 25, further comprising:
2 instructions for monitoring for receipt of call connection establishment
3 signals; and
4 instructions for executing the instructions for determining whether a ~~the~~
5 utilization of a ~~the~~ resource is above the corresponding utilization threshold and the
6 instructions for identifying each such resource upon receipt of a call connection
7 establishment signal.

1 30. (Currently Amended) The processor of claim 29, further comprising:
2 instructions for determining whether ~~an~~ ~~the~~ alarm has been generated since
3 the utilization of the resource last rose above the corresponding specified threshold;
4 and
5 instructions for executing the instructions for generating ~~an~~ ~~the~~ alarm only in
6 the event that ~~an~~ ~~the~~ alarm has not been generated since the utilization of the
7 resource last rose above the corresponding specified threshold.

1 31. (Currently Amended) The processor of claim 30, wherein the instructions for
2 generating a ~~the~~ report further comprise:
3 instructions for including the utilization of any identified resources in the
4 report.

32. (Currently Amended) The processor of claim 31, further comprising:

instructions for providing a list of resources, the list of resources including at least one of bandwidth, line card capacity, number of connection end points per line card, Virtual Path Identifier numbers, Virtual Connection Identifier numbers, MultiProtocol Label Switching (MPLS) label numbers, memory within the switch, number of supportable leaf endpoints per system, number of supportable connections in a connecting state, number of MPLS state blocks, and number of connections in a database; wherein the instructions for determining whether ~~a~~the utilization of ~~a~~the resource is above the corresponding utilization threshold are executed only with respect to resources within the list of resources, and ~~wherein the instructions for providing at least one utilization threshold comprise further comprising:~~

instructions for receiving at least one utilization threshold from ~~an~~the operator.

33. (Currently Amended) A computer-readable medium comprising instructions for monitoring resource utilization within a connection oriented network made of network connections, at least one of said network elements including a connection resource tracker for maintaining a database of resource utilization, the computer-readable medium comprising:

instructions for specifying a plurality of resource types for the network elements of the connection oriented network, each resource type being defined by a capacity limit and a utilization;

instructions for providing a utilization threshold and a specified threshold for each specified type of resource, wherein the utilization threshold is set at a threshold value used to determine whether resources are being over-utilized and the specified threshold is set at a threshold value used to determine whether resources used are exceeding a maximum allowable limit;

instructions for measuring the utilization for all resources at a network element;

instructions for, in response to a query from a user relating to a particular type of resource in said database, comparing the measured utilization for all resources of the particular type with the utilization threshold for said particular type for determining whether the utilization of any resource of said particular type is above the corresponding utilization threshold;

instructions for, if the utilization is above the corresponding utilization threshold for at least one said resource, generating a report and identifying in the report each resource of the particular type for which the utilization is above the corresponding utilization threshold and presenting the report to an operator of said connection oriented network; and

instructions for, if the utilization is above the corresponding specified threshold for at least one said resource, checking a timer associated with the resource; and

instructions for, when the timer has expired, generating an alarm for the resource and resetting the timer associated with the resource only when the alarm has been generated for the resource.

34. (Currently Amended) A method of monitoring resource utilization within a connection oriented network made of network elements, at least one of said network element including a connection resource tracker for maintaining a database of resource utilization, the method comprising the steps of:

specifying a plurality of resource types for the network elements of the connection oriented network, each resource type being defined by a capacity limit and a utilization;

providing a utilization threshold and a specified threshold for each specified type of resource, wherein the utilization threshold is set at a threshold value used to determine whether resources are being over-utilized and the specified threshold is

set at a threshold value used to determine whether resources used are exceeding a maximum allowable limit;

measuring the utilization threshold for all resources at a network element;
in response to a query from a user relating to a particular type of resource in said database, comparing the utilization for all resources of the particular type as measured in the measuring step with the utilization threshold for said particular type for determining whether the utilization of any resource of said particular type is above the corresponding utilization threshold;

if the utilization is above the corresponding utilization threshold for at least one said resource, generating a report and identifying in the report each resource of the particular type for which the utilization is above the corresponding utilization threshold and presenting the report to an operator of said connection oriented network; and

if the utilization is above the corresponding specified threshold for at least one said resource, checking whether a flag associated with the resource indicates that an alarm has recently been generated for the resource and, if the flag does not indicate that the alarm has recently been generated, generating an-the alarm and setting a-the flag to indicate that an-the alarm has recently been generated.

35. (Canceled)

36. (Currently Amended) The method of claim 34, ~~wherein the step of providing at least one utilization threshold comprises~~ further comprising:

receiving at least one utilization threshold from ~~an-the~~ operator.

37. (Currently Amended) The method of claim 36, further comprising:

the step of providing a list of resources, ~~and~~ wherein the step of determining whether ~~a-the~~ utilization of ~~a-the~~ resource is below the corresponding utilization threshold is carried out only with respect to resources within the list of resources.

38. (Currently Amended) The method of claim 37, wherein the step of generating the report further comprises;
including the utilization of any identified resources in the report.

39. (Currently Amended) A processor for monitoring resource utilization within a connection oriented network made of network elements, at least one of said network elements including a connection resource tracker for maintaining a database of resource utilization, the processor comprising:

instructions for specifying a plurality of resource types for the network elements of the connection oriented network, each resource type being defined by a capacity limit and a utilization;

instructions for providing a utilization threshold and a specified threshold for each specified type of resource, wherein the utilization threshold is set at a threshold value to determine whether resources are being over-utilized and the specified threshold is set at a threshold value used to determine whether resources used are exceeding a maximum allowable limit;

instructions for measuring the utilization for all resources at the network element;

instructions for, in response to a query from a user relating to a particular type of resource in said database, comparing the measured utilization for all resources of the particular type with the utilization threshold for said particular type for determining whether the utilization of any resource of said particular type is above the corresponding utilization threshold;

instructions for, if the utilization is above the corresponding utilization threshold for at least one said resource, generating a report and identifying in the report each resource of the particular type for which the utilization is above the corresponding utilization threshold and presenting the report to an operator of said connection oriented network; and

instructions for, if the utilization is above the corresponding specified threshold for at least one said resource, checking whether a flag associated with the

resource indicates that an alarm has recently been generated for the resource, and if the flag does not indicate that the alarm has recently been generated, generating ~~an-the~~ alarm and setting ~~a-the~~ flag to indicate that ~~an-the~~ alarm has recently been generated.

40. (Canceled)

41. (Currently Amended) The processor of claim 39, ~~wherein the instructions for providing at least one utilization threshold comprise further comprising:~~
instructions for receiving at least one utilization threshold from ~~an-the~~ operator.

42. (Currently Amended) The processor of claim 41, further comprising:
instructions for providing a list of resources, ~~and~~ wherein the instructions for determining whether ~~a-the~~ utilization of ~~a-the~~ resource is below the corresponding utilization threshold are executed only with respect to resources within the list of resources.

43. (Currently Amended) The processor of claim 42, wherein the instructions for generating the report further comprise:
instructions for including the utilization of any identified resources in the report.

44. (Currently Amended) A computer-readable medium comprising instructions for monitoring resource utilization within a connection oriented network made of network elements, at least one of said network elements including a connection resource tracker for maintaining a database of resource utilization, the computer-readable medium comprising:

instructions for specifying a plurality of resource types for the network elements of the connection oriented network, each resource type being defined by a capacity limit and a utilization;

instructions for providing a utilization threshold and a specified threshold for each specified type of resource, wherein the utilization threshold is set at a threshold value used to determine whether resources are being over-utilized and the specified threshold is set at a threshold value used to determine whether resources used are exceeding a maximum allowable limit;

instructions for measuring the utilization for all resources at the network element;

instructions for, in response to a query from a user relating to a particular type of resource in said database, comparing the measured utilization for all resources of the particular type with the utilization threshold for said particular type for determining whether the utilization of any resource of said particular type is above the corresponding utilization threshold;

instructions for, if the utilization is above the corresponding utilization threshold for at least one said resource, generating a report and identifying in the report each resource of the particular type for which the utilization is above the corresponding utilization threshold and presenting the report to an operator of said connection oriented network; and

instructions for, if the utilization is above the corresponding specified threshold for at least one said resource, checking whether a flag associated with the resource indicates that an alarm has recently been generated for the resource and if the flag does not indicate that the alarm has recently been generated, generating ~~an~~ the alarm and setting ~~a-the~~ a flag to indicate that ~~an-the~~ an alarm has recently been generated.

45. (Currently Amended) A method of monitoring and diagnosing resource utilization within a connection oriented network made of network elements, at least one of said network elements including a connection resource tracker for

maintaining a database of resource utilization, the method comprising the steps
steps of:

specifying a plurality of resource types for the network elements of the
connection oriented network, each resource type being defined by a capacity limit
and a utilization;

providing a utilization threshold and a specified threshold for each specified
type of resource, wherein the utilization threshold is set at a threshold value used to
determine whether resources are being under-utilized and the specified threshold is
set at a threshold value used to determine whether resources used are below a
minimum allowable limit;

measuring the utilization for all resources at a network elements;

in response to a query from a user relating to a particular type of resource,
comparing the utilization for all resources of the particular type as measured in the
measuring step with the utilization threshold for said particular type for
determining whether the utilization of any resource of said particular type is below
the corresponding utilization threshold;

if the utilization is below the corresponding utilization threshold for at least
one said resource, generating a report and identifying in the report each resource of
the particular type for which the utilization is below the corresponding utilization
threshold and presenting the report to an operator of said connection oriented
network; and

if the utilization is below the corresponding specified threshold for at least
one said resource, checking a timer associated with the resource; and

when the timer has expired, generating an alarm for the resource and
resetting the timer associated with the resource only when the alarm has been
generated for the resource.

46. (Currently Amended) A method of monitoring resource utilization within a
connection oriented network made of network elements, at least one of said network

3 element including a connection resource tracker for maintaining a database of
4 resource utilization, the method comprising the steps of:

5 specifying a plurality of resource types for the network elements of the
6 connection oriented network, each resource type being defined by a capacity limit
7 and a utilization;

8 providing a utilization threshold and a specified threshold for each specified
9 type of resource, wherein the utilization threshold is set at a threshold value used to
10 determine whether resources are being under-utilized and the specified threshold is
11 set at a threshold value used to determine whether resources used are below a
12 minimum allowable limit;

13 measuring the utilization threshold for all resources at a network element;

14 in response to a query from a user relating to a particular type of resource in
15 said database, comparing the utilization for all resources of the particular type as
16 measured in the measuring step with the utilization threshold for said particular
17 type for determining whether the utilization of any resource of said particular type
18 is below the corresponding utilization threshold;

19 if the utilization is below the corresponding utilization threshold for at least
20 one said resource, generating a report and identifying in the report each resource of
21 the particular type for which the utilization is below the corresponding utilization
22 threshold and presenting the report to an operator of said connection oriented
23 network; and

24 if the utilization is below the corresponding specified threshold for at least
25 one said resource, checking whether a flag associated with the resource indicates
26 that an alarm has recently been generated for the resource, and, if the flag does not
27 indicate that the alarm has recently been set, generating ~~an~~the alarm and setting a
28 the flag to indicate that ~~an~~the alarm has recently been generated.